FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid

I. APPLICANT INFORMATION

A. Applicant Name: Madison River Foundation

Mailing Address: P.O. Box 1527

City: Ennis State: MT Zip: 59729

Telephone: 406.682.3148 E-mail: info@madisonriverfoundation.org

B. Contact Person (if different than applicant): Quincey Johnson, Project & Outreach Coordinator

Address:

City: State: Zip:

Telephone: 406.624.9261 E-mail: quincey@madisonriverfoundation.org

C. Landowner and/or Lessee Name (if different than applicant): Bureau of Land Management

Mailing Address: 1005 Selway Drive

City: Dillon State: MT Zip: 59725

Telephone: 406.683.8000 E-mail: pfosse@blm.gov

II. PROJECT INFORMATION

A. Project Name: Storey Ditch Riparian Restoration Project

River, stream, or lake: Madison River

Location: Township: Cameron Range: 01W Section: 24

Latitude: 45.120758 Longitude: -111.669898 *within project (decimal degrees)*

County: Madison

B. Purpose of Project:

The purpose of the Storey Ditch Riparian Restoration Project is to restore riparian habitat along the Madison River by increasing the riparian corridor width and woody vegetation cover, creating floodplain surfaces that can support natural recruitment of woody vegetation, increasing aquatic habitat complexity and providing more shade and cover for fish, increasing primary production and food web support, and increasing biodiversity and habitat complexity to support long-term ecosystem resilience.

C. Brief Project Description (attach additional information to end of application):

The Storey Ditch Riparian Restoration Project is the second project to be completed from the Madison River Riparian Restoration Master Plan, a document outlining restoration planning framework to restore and protect riparian, wetland, and aquatic habitats on the Madison River.

The project area, located on the east bank of the Madison River upstream of the Storey Ditch Boat Launch on land managed by the Bureau of Land Management, contains a stand of riparian vegetation including mature sandbar willow and pockets of cottonwood on the downstream end of the floodplain bench, but on the upstream end of the floodplain willows are decadent and the riparian vegetation community is shrinking in size. Further upstream, the streambank has little to no woody riparian vegetation, with the exception of small pockets present on low topographic features that are hydrologically connected to the Madison River. As a result of the altered flow regime due to Hebgen Dam, the majority of riverbanks in this reach do not receive the overbank flows and scour/deposition necessary to support natural colonization by woody riparian vegetation. The glacial geology results in naturally high terraces and large substrate that are not mobilized by most flows under the current dam-controlled flow regime, limiting locations and processes that can support woody riparian vegetation. The Storey Ditch Riparian Restoration Project will incorporate multiple restoration treatments including bank restoration, planting, and wildlife fencing to enhance and restore the woody riparian vegetation along the streambanks of the Madison River to benefit the river system, wild fish populations, and generations of anglers.

D. Length of stream or size of lake that will be treated (project extent): 1,105 feet

Length/size of impact, if larger than project extent (e.g. stream miles opened): _____

E. Project Budget:

Grant Request (Dollars):	**$**	$15,548.62
Matching Dollars:	**$**	$32,500 (requested funding not included)
Matching In-Kind Services:*	**$**	$26,170
		**salaries of government employees are not considered matching contributions*
Total Project Cost:	**$**	$95,211.87

F. **Attach** itemized (line item) budget – *see budget template*

G. **Attach** specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete a *supplemental questionnaire* (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).

H. **Attach** land management & maintenance plans that will ensure protection of the reclaimed area.

III. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

Rainbow trout, brown trout, cutthroat trout, and mountain whitefish will benefit from this project.

B. How will the project protect or enhance wild fish habitat?

The Storey Ditch Riparian Restoration Project will protect and enhance wild fish habitat by increasing woody vegetative communities along the streambank of the Madison River, encouraging natural recruitment of riparian vegetation by lowering the streambank to create a hydrologically connected floodplain, and protect an existing stand of willows and aspens from wildlife browse to provide an opportunity for growth an expansion. Healthy riparian areas provide high-quality habitat for wildlife, shade and cover for fish which works to lower water temperatures, and help protect the river and its banks from erosion. By implementing the planting and bank shaping restoration treatments at Storey Ditch, the riparian corridor will be restored and its ecological function maximized.

C. Will the project improve fish populations and/or fishing? To what extent?

Yes, the project will improve fish populations and fishing by restoring riparian and aquatic habitat. The increase in woody riparian vegetation along the streambank through the bank treatments and plantings will provide more shade and cover for fish, lowering water temperatures for the benefit of the cold-water fish species that inhabit the Madison River.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

Yes, by restoring the riparian corridor to its fullest potential the ecosystem function will be maximized, benefiting wild fish populations. The project site is located in Bureau of Land Management Reach 635, just upstream from the public boat launch. Due to the public's ability to access this project site, public fishing opportunity will directly benefit from the habitat restoration efforts.

E. The project agreement includes a 20-year maintenance commitment. Please discuss your ability to meet this commitment.

The Madison River Foundation is a non-profit conservation organization based in the Madison Valley. Our growing membership, volunteer base, and full-time staff will continue our commitment to preserve, protect, and enhance the Madison River for years to come. Included in the project design are long-term maintenance and monitoring plans. The fence unit will be evaluated annually for maintenance and monitoring data will be collected to evaluate effectiveness. An annual monitoring report will be developed to document findings. The fence will be removed when vegetation has reached a height and maturity to be browse resistant, within five to ten years. The bank treatments will be monitored prior to implementation and annually after construction to evaluate percent cover of woody riparian vegetation, density of natural recruitment, species diversity, and bank structure integrity. Information gathered from monitoring these bank treatments will be used to understand the effectiveness of the treatment to expand woody riparian vegetation along the banks of the Madison River and an annual monitoring report will be developed.

F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

The project site contains little to no woody riparian vegetation, with the exception of small pockets present on low topographic features that are hydrologically connected to the Madison River. Hebgen Dam has altered the flow regime on the Madison River, resulting in few areas of the riverbank receiving the overbank flows necessary to support natural colonization by woody riparian vegetation. This site also experiences heavy wildlife browse, contributing to reduced riparian vegetation communities. The restoration treatments that will be applied at the project site will correct the cause by effectively reshaping the bank so it is at bank-full height rather than terrace height to allow for hydrologically connected floodplain surfaces to develop. This will expand the riparian bench to allow for natural recruitment and development of mature riparian vegetation as more of the bank is accessed by seasonal high flows. Live willows and brush will be incorporated into the bank to create a rough boundary dissipating flow energy and providing aquatic habitat and overhanging cover. This technique will provide a complex, vegetated bank margin creating aquatic habitat and supporting vegetation establishment. Lastly, containerized nursery plants will be installed on the expanded riparian bench in the floodplain above base flow elevation. Each plant will receive an individual browse protector cage to protect the plant from wildlife browsing. These containerized plantings will support revegetation and provide a seed source for the riparian area.

G. What public benefits will be realized from this project?

The project is located on public land along the Madison River and will be highly visible by many river users. An educational sign will be installed at the public boat launch to inform the public about the importance of riparian habitat, describe the restoration project and its goals for the Madison River, and invite people to engage and help support ecological river stewardship. This project will help demonstrate to the public how a healthy riparian corridor should look as well as the benefits and results of a strong woody vegetation community along the river. Cooler water temperatures, increased cover and shade for fish will correlate to an improved fishing experience to be enjoyed by all anglers.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No.

I. Will the project result in the development of commercial recreational use on the site? (explain):

No.

J. Is this project associated with the reclamation of past mining activity?

No.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:  Date: May 27, 2020

Sponsor (if applicable): _____

Submittal: **Applications must be *signed and received before* December 1 and June 1 of each year to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

Mail to:	Montana FWP Fish Management Bureau PO Box 200701 Helena, MT 59620-0701	Email:	Michelle McGree mmcgree@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov

Applications may be rejected if this form is modified.

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION *	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel* **								
Survey	40	hrs	$100.00	$ 4,000.00			4,000.00	$ 4,000.00
Design	45	hrs	$100.00	$ 4,500.00			4,500.00	$ 4,500.00
Engineering	90	hrs	$125.00	$ 11,250.00			11,250.00	$ 11,250.00
Permitting	20	hrs	$40.00	$ 800.00		800.00		$ 800.00
Oversight	70	hrs	$120.00	$ 8,400.00		8,400.00		$ 8,400.00
Monitoring/Maintenance	40	hrs	$100.00	$ 4,000.00		4,000.00		$ 4,000.00
			Sub-Total	$ 32,950.00	$ -	$ 13,200.00	$ 19,750.00	$ 32,950.00
Travel								
Mileage	870	miles	$0.575	$ 500.25			500.25	$ 500.25
Per diem				$ -				$ -
			Sub-Total	$ 500.25	$ -	$ -	$ 500.25	$ 500.25
Construction Materials** **								
10' Wooden Posts	39	Each	$7.00	$ 273.00	273.00			$ 273.00
8' Graduated Woven Wire	585	Linear Feet	$3.40	$ 1,989.00	1,989.00			$ 1,989.00
Fence Staples	117	Each	$0.06	$ 7.02	7.02			$ 7.02
Ground Staples	78	Each	$0.70	$ 54.60	54.60			$ 54.60
Containerized Nursery Plants	50	Each	$6.00	$ 300.00	300.00			$ 300.00
Fence	500	Linear Feet	$1.00	$ 500.00			500.00	$ 500.00
Individual Browse Protector Cage: T-posts	150	Each	$4.00	$ 600.00			600.00	$ 600.00
Clips	300	Each	$0.06	$ 18.00			18.00	$ 18.00
			Sub-Total	$ 3,741.62	$ 2,623.62	$ -	$ 1,118.00	$ 3,741.62
Equipment, Labor, and Mobilization								
Install Fence	585	Linear Feet	$5.00	$ 2,925.00	2,925.00			$ 2,925.00
Bank Shaping: Construction	1105	Linear Feet	$20.00	$ 22,100.00	10,000.00		12,100.00	$ 22,100.00
Brush Matrix: Acquire Brush	1980	Each	$2.00	$ 3,960.00		3,960.00		$ 3,960.00
Brush Matrix: Acquire Willow Cuttings	4950	Each	$1.00	$ 4,950.00		4,950.00		$ 4,950.00
Brush Matrix: Construction	990	Linear Feet	$10.00	$ 9,900.00			9,900.00	$ 9,900.00
Install Containerized Nursery Plants	50	Each	$6.00	$ 300.00		300.00		$ 300.00
Install Individual Browse Protector Cage	50	Each	$15.00	$ 750.00		750.00		$ 750.00
Labor support for construction (In-kind)	14	Days	$215.00	$ 3,010.00		3,010.00		$ 3,010.00
Mobilization and demobilization	0.05	5% of const.	$2,500.00	$ 125.00			125.00	$ 125.00
Contingency (20% of est. const. cost)				$ 10,000.00			10,000.00	$ 10,000.00
			Sub-Total	$ 58,020.00	$ 12,925.00	$ 12,970.00	$ 32,125.00	$ 125.00
			TOTALS	$ 95,211.87	$ 15,548.62	$ 26,170.00	53,493.25	$ 95,211.87

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used for calculations). Describe here or in text.

Reminder: Government salaries cannot be used as in-kind match

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

MATCHING CONTRIBUTIONS (do not include requested funds)

CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
NorthWestern Energy	$ -	$ 20,000.00	$ 20,000.00	Y
Bureau of Land Management	$ -	$ 12,500.00	$ 12,500.00	Y
Patagonia	$ -	$ 15,000.00	$ 15,000.00	N
Moonlight Club Community Foundation	$ -	$ 7,000.00	$ 7,000.00	N
Yellowstone Club Community Foundation	$ -	$ 5,000.00	$ 5,000.00	N
Madison River Foundation Donors	$ -	$ 20,163.25	$ 20,163.25	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 79,663.25	$ 79,663.25	

Storey Ditch Riparian Restoration

Madison River Foundation, Geum Environmental Consulting, and Bureau of Land Management

Restoration concepts are based on the *Madison River Riparian Restoration Master Plan* (Geum, 2018); a document outlining a restoration planning framework to restore and protect riparian, wetland, and aquatic habitats on the Madison River. Restoration concepts presented here are preliminary and were developed based on a site visit, aerial imagery interpretation and analysis of LiDAR data. The Project Area can be accessed from Ennis, MT by travelling south on Highway 287 for approximately 15.5 miles, then turn right onto a road leading to Storey Ditch Boat Launch and travel approximately 1 mile to the parking area. The Project Area is upstream of the boat launch and is displayed on Figure 10.

Existing Conditions and Project Goals

The Project Area is located on the right bank of the Madison River upstream of the Storey Ditch Boat Launch on land managed by the BLM, and it extends from the boat launch upstream approximately 4,000 ft. Near the boat launch on a low floodplain bench, a stand of riparian vegetation is present including mature sandbar willow (*Salix exigua)* with pockets of cottonwood *(Populus spp.*). On the upstream end of this floodplain bench, willows are decadent and the riparian vegetation community appears to be shrinking in size as seen in Figure 1.

Figure 1. Decadent, browsed willow saplings on the upstream end of the floodplain bench. The mature willow complex can be seen in the background of the photo on the left.

Further upstream, the Madison River streambank has little to no woody riparian vegetation as seen in Figure 2. Small pockets of woody vegetation are present on low topographic features that are hydrologically connected to the Madison River; however, these pockets of vegetation do not appear to be expanding. In this reach the opposite bank exhibits a mature willow complex that provides high ecological value to the fishery. As a result of the altered flow regime due to Hebgen Dam, the majority of river banks in this reach do not receive the overbank flows and scour/deposition necessary to support natural colonization by woody riparian vegetation. The glacial geology results in naturally high terraces and large substrate (cobbles and boulders) that are not mobilized by most flows under the current dam-controlled flow regime. This further limits locations and processes that can support woody riparian vegetation.

Figure 2. Madison River bank within the Project Area with no woody vegetation, while the opposite bank supports a robust riparian vegetation community.

Factors limiting woody riparian vegetation within the Project Area include wildlife browse and limited hydrologic connectivity between the river and floodplain. To address these limiting factors, restoration goals within the Project Area include:

- Increase riparian corridor width and woody vegetation cover;
- Create floodplain surfaces that can support natural recruitment of woody vegetation within the constraints of the altered flow regime;
- Increase aquatic habitat complexity and provide more shade and cover for fish;
- Increase primary production and food web support; and
- Increase biodiversity and habitat complexity to support long-term ecosystem resilience.

Restoration Strategies

Restoration strategies include treatments designed to address limiting factors within the Project Area to improve ecological function and set the site on a trajectory to reach project goals. Restoration treatments and access routes are displayed on Figure 10 and described below.

Wildlife Fence. Install a wildlife fence protecting approximately ½ acre of riparian woody vegetation in the floodplain where browse has limited establishment of young willows. Wildlife fence would be 8’ tall graduated wire fence with untreated wood posts and a gate for maintenance and monitoring as displayed in Figure 3 and Figure 4. The fence unit would be evaluated annually for maintenance and monitoring data would be collected to evaluate effectiveness. An annual monitoring report would be developed to document findings. The fence would be removed when vegetation has reached a height and maturity to be browse resistant.

Figure 3. Example of a wildlife exclosure fence installed at restoration site near Lincoln, Montana.

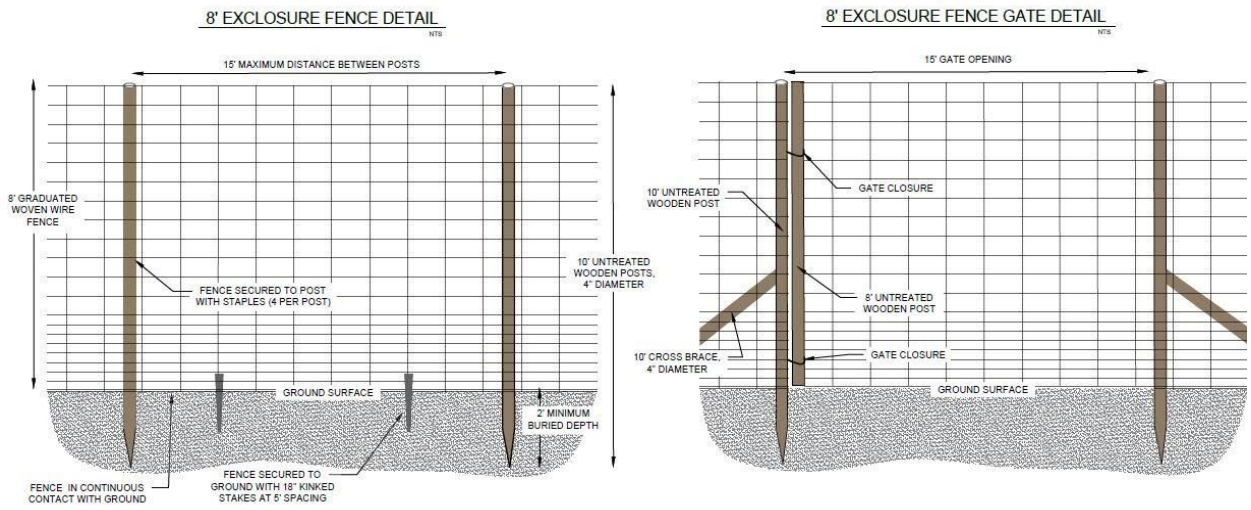

Figure 4. Wildlife exclosure fence detail drawings to support implementation.

Bank Treatment. Construct streambank treatments along three sections of the Madison River where hydrologic connectivity is limited due to high banks and riparian woody vegetation is absent. The bank treatment will effectively reshape the bank so it is at bankfull height rather than terrace height to allow for hydrologically connected floodplain surfaces to develop. This will expand the riparian bench to allow for natural recruitment and development of mature riparian vegetation as more of the bank is accessed by seasonal high flows. This treatment works with the altered flow regime on the Madison River to create locations where natural processes can work to increase self-sustaining riparian vegetation. Bank treatments will consist of a combination of active and passive restoration treatments including: bank shaping, brush matrices, and containerized planting. A different combination of these treatments will be applied at each location to better understand effectiveness of the different treatments within the Madison River system.

- Bank Shaping: To shape the bank, an excavator or dozer would move existing material from the crest of banks down toward the bank toe, or bottom, as illustrated in Figure 5. This will be done by starting approximately 8-10 feet back from the edge of the glacial terrace and shaving off material at a 10:1 slope to lower the scarp and create a lower bench. The material in the 'cut' substrate will consist of natural cobble or boulder material that will function to provide toe protection for the bank. The riparian bench created by moving the 'cut' substrate should extend approximately 15-20 feet from the

bankfull water surface elevation into the floodplain, resulting in the bank extending 6 to 8 feet into the river relative to its current location. The bank will be shaped so as not to create an abrupt change in the bank line. This will create a floodplain surface that is hydrologically connected during high flows and will support natural recruitment and development of riparian vegetation.

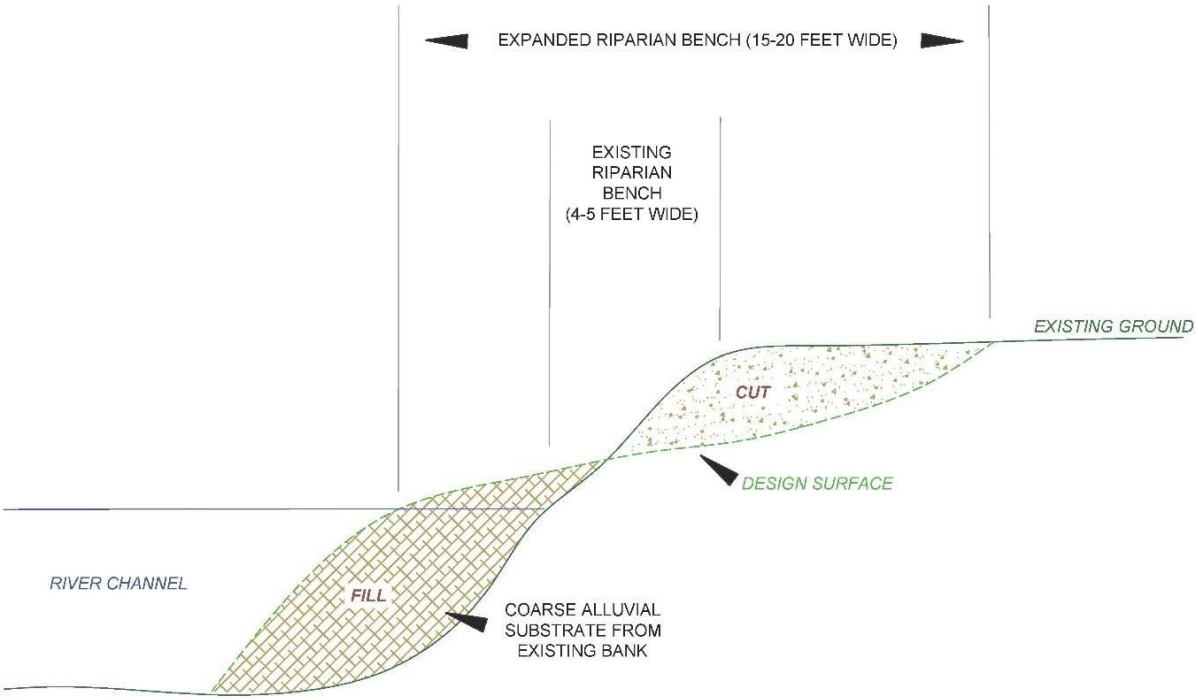

Figure 5. Cross section of river bank displaying movement of material from the crest of bank (cut) to the toe of bank (fill) to create an expanded riparian bench with the bank shaping.

- Brush Matrix: At select locations, the bank treatment will include a brush matrix near the toe of the bank. The brush matrix will incorporate live willows and brush into the alluvium at a bankfull elevation to create a rough boundary dissipating flow energy and providing aquatic habitat and overhanging cover as illustrated in Figure 6. This material would be installed in layers as the 'cut' material is moved toward the channel with the brush and willows being applied in bundles or groupings. The number of layers will depend on final elevations of the riparian bench relative to bankfull elevation. Brush and willows would extend into the channel with the stems buried and in contact with the river's baseflow elevation.

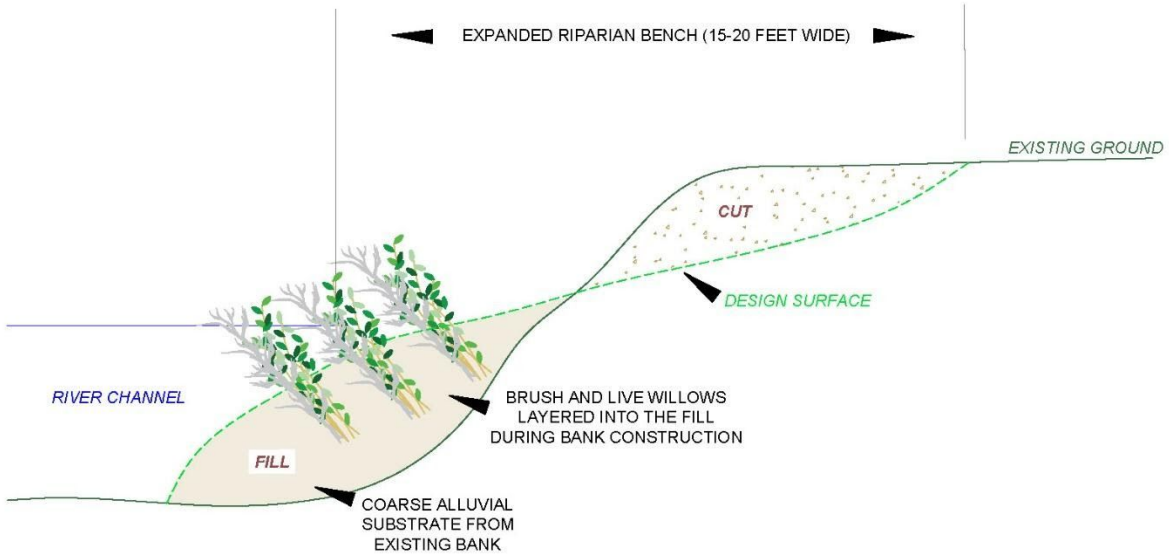

Figure 6. Cross section of river bank displaying installation of brush and willow cuttings to create a brush matrix near the toe of the bank treatment.

- Containerized Planting: At select locations, containerized nursery plants will be installed as part of active restoration. Plants would be installed on the expanded riparian bench in the floodplain above baseflow elevation. Due to high levels of wildlife browse, each plant would receive an individual browse protector cage as displayed in Figure 7.

Figure 7. Diagram of individual browse protector cage and an example of installed cages.

Bank treatments would be monitored prior to implementation and annually after construction to evaluate percent cover of woody riparian vegetation, density of natural recruitment, species diversity, and structure integrity. Information gathered from monitoring these bank treatments would be used to understand effectiveness of this treatment to expand woody riparian vegetation along the banks of the Madison River and an annual monitoring report would be developed. Examples of constructed bank treatments are displayed in Figure 8 and Figure 9.

Figure 8. Example of bank treatment with brush matrix installed at the toe of the bank. Straw wattles were used for temporary erosion control due to the steep bank; these would not be necessary on the Madison River.

Figure 9. Example of a brush matrix being installed in a bank treatment on Ninemile Creek. The willows and brush are being buried to baseflow water elevation to promote establishment and then the bank will be backfilled to design elevation.

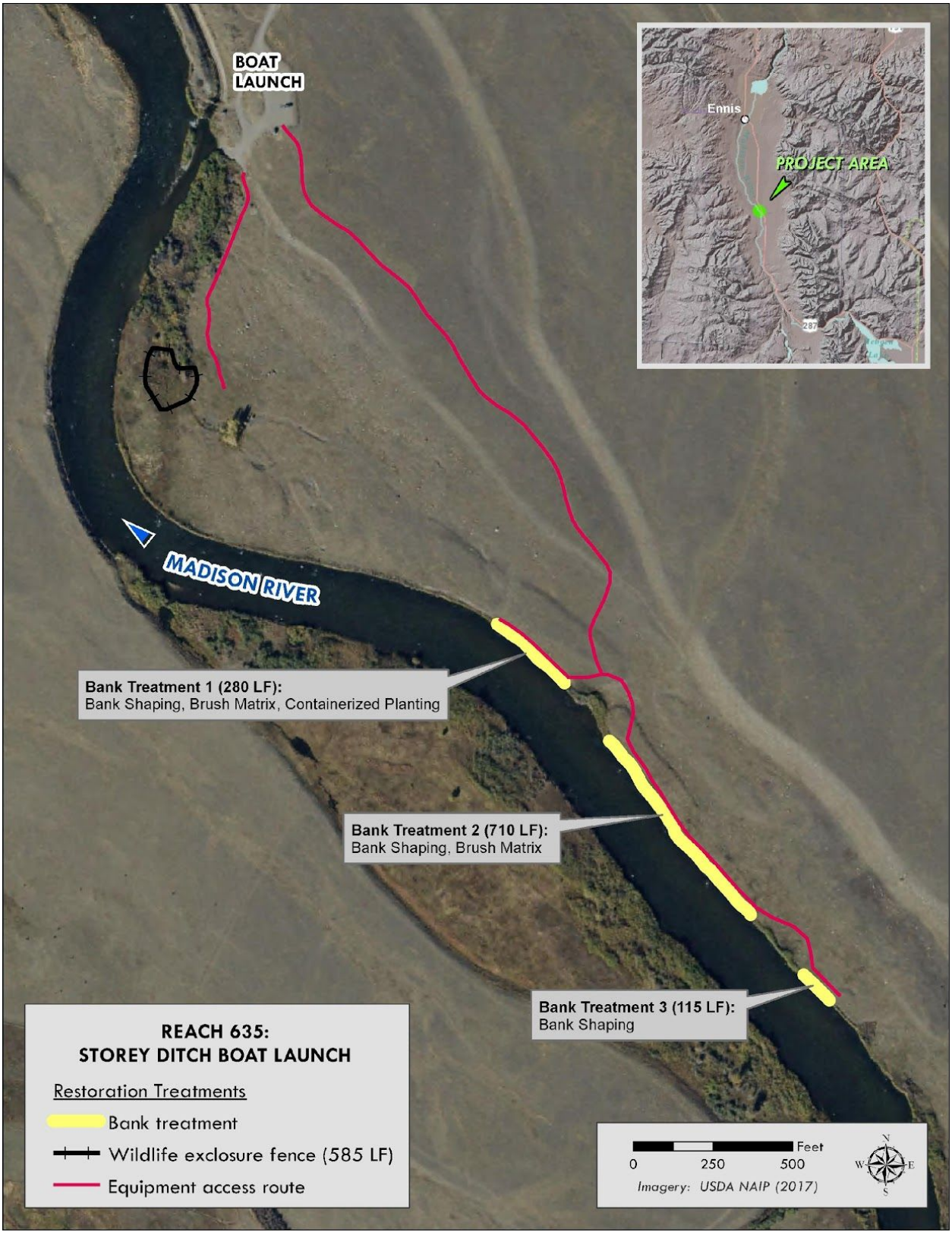

Figure 10. Overview of restoration treatments within the Project Area.

Storey Ditch Land Management & Maintenance Plans:

The project is located on Bureau of Land Management Reach 635, upstream of the public Storey Ditch Boat Launch. This reach is managed by the BLM Dillon Field Office, and is not grazed by livestock. The project will be monitored and maintained by the Madison River Foundation.

An annual monitoring report will be developed to document the effectiveness of the restoration treatments. The bank treatments will be monitored prior to implementation and annually after construction to evaluate percent cover of woody riparian vegetation, density of natural recruitment, species diversity, and bank structure integrity. Information gathered from monitoring these bank treatments will be used to understand the effectiveness of the treatment to expand woody riparian vegetation along the banks of the Madison River. The wildlife fence unit will be evaluated annually for maintenance and monitoring data including percent cover of woody vegetation, natural recruitment, and woody vegetation survival will be collected to evaluate effectiveness. The fence will be removed when vegetation has reached a height and maturity to be browse resistant, within five to ten years.